Ah.1.478

ENVIRONMENT VIEWS

VOLUME TWO
NUMBER THREE
AUGUST SEPTEMBER 1979

SECOND CLASS MAIL REGISTRATION NUMBER 4405

CANADIANA
OCT 10 1979

LAUREN DALE

River Shorelands of Alberta

ISSN 0701-9637

ENVIRONMENT VIEWS

Environment Views is published bi-monthly by Alberta Environment. Each issue deals with a specific topic from various viewpoints with the aim of increasing awareness of environmental issues among Albertans. The views expressed by the publication are not necessarily those of Alberta Environment.

Subscriptions are free and can be obtained by mailing the enclosed card. When notifying *Environment Views* of a change of address, please quote the subscription number on your mailing label.

Permission to reproduce any part of this publication for commercial purposes should be obtained by writing the address below. Reproduction for other purposes should credit this publication.

Letters to the editor are welcomed, and should be sent to The Editor,
Environment Views,
Alberta Environment,
Communications Branch,
12th Floor, Oxbridge Place,
9820 - 106 Street,
Edmonton, Alberta T5K 2J6

Editor:
Gillian Sniatynski

Editorial Board:
Joe Will, Susan Bramm, Ron Hilton, John Russell, Dan Stoker

Alberta
ENVIRONMENT

Contents

Alberta's River Shorelands 3
Often overlooked or misused, they're a valuable potential resource presenting unique planning problems.

Perspectives On Shorelands 6
A user sample turns up often divergent views.

Preparing For The Unpredictable 10
A new report analyzes the Fort McMurray flood situation.

A Park Is Born 12
Years of planning and co-operation have borne fruit in Edmonton's Capital City Recreation Park.

Down By The Riverside 16
The Bow River flows through Calgary--and Calgary makes the most of it.

Floodwaters Ebb, Problems Remain 18
Flooding and poor drainage beset Vermilion River basin users.

Invasion Of The Last Refuge 21
Wildlife are threatened by development along river shorelands.

What If The River Rises? 23
The city of St. Albert faced this question more than a century after its founding.

The Good, The Bad And The Ugly? 25
A discussion of different options in river management.

Letters 27

Environment Update 28

Introduction: Gillian Sniatynski

Alberta's River Shorelands

A question of control or adaptation to nature.

Look at this! As fast as I can clean up, more garbage floats down and clutters up my basement!

The cover of a Peace River Regional Planning Commission report bears the following quotation:

"From the place which we quitted this morning, the West side of the river displayed a succession of the most beautiful scenery I had ever beheld...This magnificent theatre of nature has all the decorations which the trees and animals of the country can afford it: groves of poplars in every shape vary the scene; and their intervals are enlivened with vast herds of elks and buffaloes...The whole country displayed an exuberant verdure... which no expressions of mine are qualified to describe."

The writer was the explorer Alexander Mackenzie. He was describing the scene from the Peace River, two days out from Fort Fork, near the confluence with the Smoky River. The date? May 10, 1793.

His enthusiasm marks him as an early admirer of a resource today's Albertans tend to treat with much less interest--river shorelands.

Perhaps this is because too few people nowadays get a chance to take the sort of long view of the "magnificent theatre of nature" that delighted Mackenzie. Our river shoreland vistas are likely to be interrupted by hydro dams, feed lots, resort cottages, or gravel pits. (The aerial photograph of Calgary, shown on Pages 16 and 17, shows just how many land uses can be crammed into a relatively short stretch of river shoreland.)

Our vision is blocked in other ways, too. It's hard to consider as a single entity the shoreland of a river that flows for thousands of kilometres--much easier, we feel, to deal with the particular little chunk that happens to be under foot. Much easier, too, to think about the river as constituting the real resource, and the shoreland as merely that piece of real estate which gives access to it.

One man who has worked hard to change that way of looking at river shorelands is a Seattle, Washington-based consulting engineer who, like Mackenzie, looks at shorelands from the perspective of the river and enthuses about potential, if not actual attractions.

Wolf Bauer can include trips on the Athabasca, the North Saskatchewan, the Kootenay and the Bow in his 30,000-plus kilometres of kayaking, and he does more than just look at the scenery. He studies the river literally from the inside out, taking diving gear to examine the effects of obstacles in the river, checking out how eddies work, examining in minute detail the natural processes of erosion and accretion at work.

Bauer sees the river as a natural system. Intimately linked to the river itself is what he calls the shore process corridor--that "earth-water diffusion zone" where the river meets the land.

In Bauer's terms, the "process" part of the "shore process corridor" is crucial. He told a seminar on shoreland environments sponsored by Alberta Environment in December, 1977: "We have to put the term 'process' into that shore process corridor in order to convey that this is not a real-estate type of land-water interface. This is a dynamic zone in which an actual process goes on..."

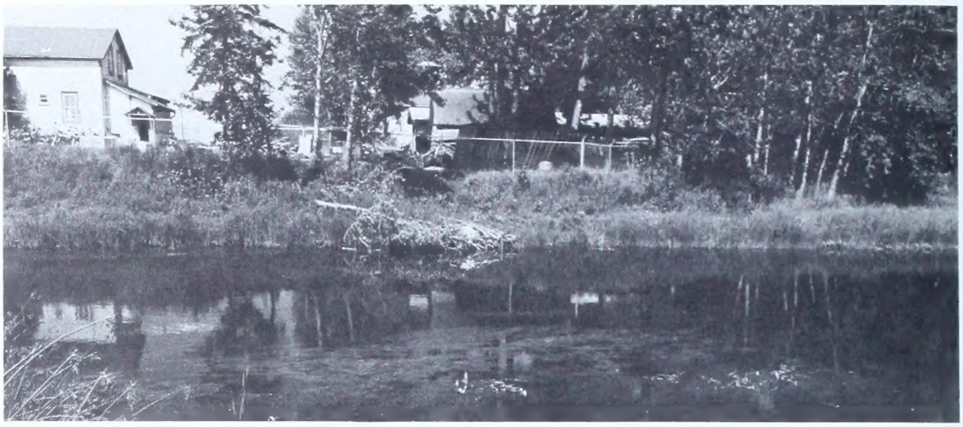
In other words, the shoreland--or shore process corridor--isn't a stable and unchanging piece of land that happens to be adjacent to the river. It changes as the river changes. So it follows that any attempt to modify or control the river will affect the shoreland too, in perhaps unforeseen ways.

To understand why this is so, it's necessary to consider some characteristics of rivers that Bauer has specified.

A river which runs from the mountains to the sea or a lake has a gradient curve which starts steep and gradually flattens out. Changes in the gradient or slope of the channel will have an effect on the velocity of the water, and hence on its ability to move materials.

Bauer maintains that rivers which run from mountains to sea such that the whole gradient curve is represented show certain distinct environments, based on the gradient changes.

The system is governed by inflexible principles of hydrology. In his Edmonton seminar, Bauer noted that the river "has operated



here for thousands of years; it is stuck with this topography, this is what it has to work with in terms of its seasons, in terms of its hydrology, in terms of its gradient and the materials it's in."

In other words, to put it baldly, the river has to do what the river has to do. And the shoreland develops accordingly, from steep banks, say, in the upper reaches, through gravel beaches down to the fertile estuary.

The different characteristics of the shoreland environments lend themselves to different constraints and opportunities in terms of land use management. What works well in one zone may be inappropriate for another and vice versa. So it may make sense to locate cottage developments in the steep upper reaches, where there's less chance of flooding. Cottages may be less well suited to the braided, gravelly pastoral zone further downstream, but, says Bauer, this may be excellent for fish spawning. What's important, he says, is to consider the total system as a *natural* system, and adapt to it.

Left to itself, the biological system has already done so, Bauer notes. The problems occur when man steps in and decides that the river--and the shoreland--should adapt to him instead. "And this," he says, "is where we have problems, this has cost us tax dollars, this has caused us the grief..."

We come to grief, says Bauer, largely because we try to do things to bits of rivers, instead of considering the whole system. We devise schemes to prevent erosion along stretches of a river bank--without taking into account that the material taken from one spot is being deposited by the natural process of accretion at the next bend.

If a particular reach of shoreland is subject to flooding, we throw up a dike--which has the effect of narrowing the floodway, increasing the velocity of water and the amount of material it's able to carry, and thereby creating problems further downstream. (Problems of flooding, and the complications which structures on the river can cause, are discussed in the stories on Pages 10 and 18).

Nobody, least of all Bauer, is asserting that rivers should be left totally to themselves. "Housekeeping" should be done to clear debris, prevent log jams and so on. It *is* possible, too, to exert a measure of control over the river, especially when it comes to flooding. But this is best done by working *with* nature, as the story on Page 25 notes.

When it comes to river shoreland planning, however, considering the natural system is easier said than done. In a recent interview Bauer conceded that in terms of such planning "you people in Alberta seem to be ahead in many respects." But he added that, in much of the work he had read, the natural system was being left out of the planning process.

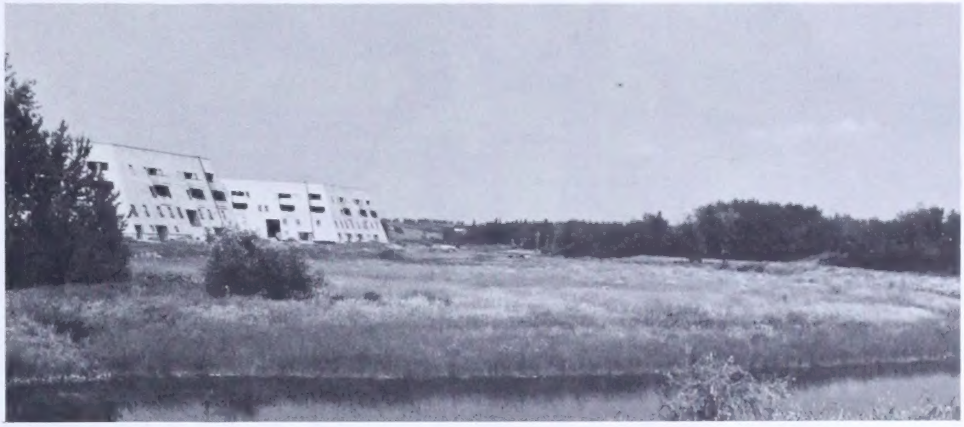
Why does this happen?

In the first place, rivers flow through, frequently, several municipal jurisdictions; decisions about land use of the shorelands are made by each separate jurisdiction about that section of shoreland for which it is specifically responsible.

Secondly, there are often conflicts between different groups of users of river shorelands, who have different demands and hence different requirements to make of the area. Often conflicts are exacerbated when new users try to move in and threaten to displace longer-established users. For example, river shorelands in many parts of the province have been a traditional preserve for livestock grazing. But those who would prefer to see those particular shoreland reaches used for, say, recreational purposes, consider livestock grazing there to be detrimental; they feel it causes erosion on the banks and pollutes the water.

Indeed, conflicts between different river shoreland users are the theme of several articles in this issue. The story on Page 21, for example, shows how several shoreland developments across the province are affecting wildlife habitat. And the concerns expressed

LAUREN DALE



in the article on Page 6 show all too clearly that not everyone thinks alike on what river shorelands should be used for.

Thirdly, until recently little planning was done on river shorelands because there was little pressure on planners to do so. The potential of river shorelands for a wide range of recreational and other uses has only slowly been recognized. Most people have traditionally considered river shorelands to be a poor second to lake shorelands (though there may be an exception in Edmonton, where long-range planning from the turn of the century has now borne fruit in the Capital City Recreation Park--see the story on Page 12). But now, as the province's limited lake shoreland resources become increasingly overtaxed, river shorelands look more and more attractive.

Regional planning commissions, which are the main bodies responsible for land use decisions about river shorelands, have access to considerable technical information and expertise on which to base those decisions. Alberta Environment's river engineering branch conducts complex studies to determine likelihood and extent of flooding on particular rivers. These flood plain studies, now being conducted on rivers across the province on a priority basis, give local municipalities or planning commissions help in deciding, say, where to locate housing developments or recreation areas. (How one jurisdiction--the City of St. Albert--responded to a flood plain study on the downtown reaches of the Sturgeon River is discussed on Page 23).

Alberta Environment's regional land use branch also reviews applications for subdivisions within .8 kilometres of the bed and shore of a river or stream. The branch's objective is to prevent the irreversible allocation of high-quality agricultural, recreational, and high water yield lands and quality water bodies to incompatible purposes; in the case of land near rivers, the major concerns are whether the area lies within the river's flood plain, and whether subdivision is likely to cause major land disturbance.

Though the department's role is advisory, land use branch head Fred Schulte notes that in most cases, planning commissions who are the recipients of the branch's recommendations "usually take them seriously."

In other ways, too, there is evidence of increasing concern about river shorelands and a desire to preserve them as a resource. For example, the Edmonton Regional Planning Commission's draft regional plan notes:

> *"Development of stream shorelands for their varied potential uses may...result in land use conflicts and adverse environmental impacts. Sand and gravel extraction, power transmission lines, sewage and water treatment plants and roadways all reduce the scenic attraction of stream shorelands in urban and rural areas. Soil erosion may be increased by poor agricultural practices and clearing of natural vegetation. Slope stability problems may be encountered as a consequence of development which fails to account for the natural limitations and characteristics of stream valley lands. Flood damage may be costly to developments located on active stream floodplains. Critical wildlife winter range and habitat may be lost by human development on shorelands."*

Consequently, the plan's objectives are "to acknowledge stream shorelands as a limited and valuable resource by ensuring their conservation for use and enjoyment of the region's residents."

The plan designates river shorelands as nature conservation, open space and recreation areas, with land uses to be limited to those which "will not compromise the recreational potential and open space opportunities of such land and which are harmonious with the natural and open space character of the stream valley system."

The plan also provides for special stream shoreland management studies, to be undertaken on any shoreland identified by the commission as currently experiencing or likely to experience development pressure strong enough to jeopardize its natural amenities.

Designating shorelands as conservation areas, and making provision for careful scrutiny of future development, is a time-buying device which prevents bad land use decisions being made in the pressure of the moment. But it doesn't solve one basic problem: *how* to evaluate river shorelands as a resource, how to decide which land uses are suited to which portions of shoreland, and above all how to assess the total shoreland as a natural system.

The task force on shorelands sponsored by Alberta Environment has been working on a solution to the problem, with the cooperation of regional planning commissions across the province.

On the theory that a new approach was needed to the problem of land use planning for river shorelands, a pilot study was conducted in each of five planning commissions, with the aim of accumulating data about shorelands in the different regions, and assessing different approaches to shoreland evaluation.

Each planning commission involved--Calgary, Peace River, Oldman River, Red Deer and Southeast Alberta--tried a somewhat different approach to its study, and the shoreland areas under study ranged from a whole river (the Little Red Deer) to a particular stretch (the Southeast Alberta Regional Planning Commission, for example, studied the South Saskatchewan River shoreland area through Medicine Hat).

Each study contained an evaluation of its respective shoreland as a resource, noted the uses it was currently or potentially capable of sustaining, and dealt with user conflicts and problems. (And several problems --like access to shorelands, vandalism and environmental protection--were common to all). Information came from technical sources, and concerned citizens.

Pooled information from all the studies will hopefully contribute to a methodology for assessing river shorelands that will help solve problems caused when too many demands are placed on too few shorelands.

Gillian Sniatynski is the freelance editor of this magazine.

Perspectives On Shorelands

There are many views on what we should do with them.

River shorelands are open to a wide range of uses, from livestock grazing to resort development, from farming to gravel pits, from wildlife habitat to travellers' campsites.

Not all shoreland uses are compatible, and one of the major problems facing today's planners is how to decide which represents the best possible use of any particular stretch of shoreland.

In many cases, those with a vested interest in river shorelands can put a strong case for having their particular needs met.

Environment Views asked the following individuals the question: "What, from your perspective, is the key issue relating to river shorelands in Alberta?" Their replies indicate the diversity of views which lie at the heart of the user conflicts.

Howard Falkenberg
President, Unifarm

One of the concerns we have is that the river shorelands be properly managed from the point of view of livestock--that livestock don't pollute the river and yet have right of access to the water.

We have a committee that has been meeting and trying to formulate a code of ethics of livestock production that would take into account the river shorelands. The committee has looked at a number of policies in other provinces and tried to pull out what would be applicable here.

Another concern of a lot of farmers with land along rivers is hunters, who feel they have a right to private property along the river. Sometimes they don't honor fencing or the fact that there are livestock there.

Elmer Kure
Director of environmental public relations, Alberta Fish and Game Association

In 1905 Alberta became a province and assumed responsibility for the disposition of land. It was not until 1930 that resources were deemed also under the control of the provinces--so a logical mistake was made. Water and wildlife were renewable resources but were not recorded on deeds to land or as public or Crown resources. The mistake has caused us much trouble ever since as wildlife have been taken for granted and streams and lake shorelands fallen prey to development.

Nature however is a great healer and given some protection much of our shorelands will heal. These matters have been a great concern of the Alberta Fish and Game Association for over 50 years. But only recently, through wildlife and fisheries programs sponsored by sportsmen's dollars, has any effort been made to recapture these natural values.

There is new hope, however, as regional planning commissions develop their regional plans that these two public resources will be given some of their traditional values in the scheme of things. Land use plans are unfolding following considerable debate and public hearings, and hopefully our heritage of wildlife and clean waters will be given equal priority with good food-producing lands.

Richard White
Associate planner, Red Deer Regional Planning Commission, author of the Little Red Deer River pilot study.

The key issue relating to river shorelands boils down to a question of whether the shorelands are distinctive in some way or whether they are just another resource that has a multiple use application and therefore lacking a great deal of priority.

We have been rather responsible in recognizing that rivers supply specific functions, but we have not been so responsible for shorelands--we seem to think that all the uses and functions of land anywhere can also be served by river shorelands.

The biggest question confronting river shorelands is what is most appropriate. I happen to believe as a result of studies I have done that river valleys are principally and distinctively equipped to supply recreational functions and habitat for wildlife. This does not mean that they are not well suited for other functions, but I would suggest those other functions should be of lower priority. If we can protect the recreation and wildlife habitat functions and supply their needs, after that we can accommodate additional uses which are not in conflict with them.

Ron Hooper
Member, Alberta Wilderness Association

The issue that requires reconciliation is the identifying procedure whereby diverse and frequently conflicting pressures on shorelands can be resolved.

One of the specific areas we feel needs to be addressed is the identification and preservation of some segments of shorelands because of their recreational value and ecological significance.

The association is currently involved in preparing a proposal covering the legislation required for river protection and the types of management responses associated with it. One of the real problems we have had in coming forth with a proposal is what kind of corridors are optimally required. In the United States these range from almost half a kilometre to entire watersheds.

We recognize the need for a flexible approach and are aware of the user pressures in the white zone (the part of the province where land use decisions are made by local planning commissions) on water resources and shorelands, and the fact that often they are not compatible. Certainly we are going to have to compromise--but if you are aware of all the conflicts then you can help resolve issues.

LAUREN DALE

Bruce Wilson
Co-ordinator, facility development, Travel Alberta

The excess of demand over supply for water-based recreational land is exemplified by the amount of Alberta vacation home investment going into Montana and British Columbia.

The Columbia Valley, Shushwap, and Whitefish-Kalistell areas are dominated by Alberta vacation home-owners. Largely, this can be attributed to a lack of quality lakes in southern Alberta, but also, overly restrictive policies and controls.

River shorelands could provide Albertans with the water-based vacation and recreation environment they are seeking. Carefully planned development, both of a commercial resort nature and vacation cottages, can be realized on river shorelands. The land use planning and zoning process must recognize this and make allowances for it rather than becoming too idealistic and overly restrictive in controls mechanisms. Our deficit balance of payments on the tourism account in Alberta is in excess of $150 million and is increasing rapidly. Providing Albertans with water-based vacation opportunities in their own province would be a step in the right direction to stemming the outflow of Albertan tourism dollars.

Gloria Garratt
President, Paddle River Headwaters Protective Association. (The association was formed five years ago by citizens concerned about proposals to dam the Paddle River.)

We wanted to see that the actual river beds and sides of rivers were not abused by anyone--by farming practices, sewage dumping and so on. We also didn't want to see smaller rivers dammed--especially not just for recreational use.

Diking and canals work better than dams, which spoil the flow of a river. Rivers should be left in their natural state, because they have a reason for being, a direction and flow.

As a group, we also feel really strongly that flood plains should be designated so that people who are going to live there know it's a flood plain and confine farming practices, for instance, to those suitable to the area. The community and the province shouldn't have to pay for crops lost in a flood plain.

Robert Holmes
Certification chairman, Alberta Recreation Canoe Association

Basically we are talking about the individual interests or demands of paddlers, depending on their proficiency.

Wild water canoeists need access to the river, and they are more concerned about the quality of the water in terms of navigability, rapids, the prospect of a challenge. The tripping canoeists, depending again on their ability as paddlers, will take these factors into consideration, but are also looking for different types of landscape features, opportunities for photography, wildlife and so on. They are also looking for areas which are rather remote.

As far as the shoreland is concerned, they are looking for quality-type primitive campsites, where there's no conflict with other user groups. As for roads, railroad tracks and so on, anything that puts a buffer zone between conflicting interests is appreciated.

Canoeists are looking for more, primitive wilderness experiences. As far as the shorelands go, things should be left as natural as possible.

Dr. Arleigh Laycock
Professor of geography and director of water resources centre, U of A, outgoing president, Canadian Water Resources Association

It is often suggested that we should return stream environments to the natural condition. In many basins in Alberta this might result in better environments than those we have today.

In most areas, however, we can do better than this through providing for environmental enhancement according to well defined objectives.

Our natural flow patterns and thus our stream shorelands are not ideal in most areas. Too many of our streams have brief and flashing natural flooding in spring and deficient flow in summer, fall and winter with major variation from season to season and year to year.

With improved watershed management, artificial storage and diversion, for example from larger rivers of mountain origin, we might enhance flow patterns and water quality for stream and stream-side uses by man, fish and wildlife.

The erosion and deposition patterns along most streams may continue to be dominated by the more extreme flooding, but they can be modified appreciably and more attractive and useful stream and streamside environments can be obtained. In some muskeg regions controlled drainage may result in stream quality and flow regime improvements as well as more productive forest and wildlife environments. Use conflicts, for example between stock watering and fishing, will be present in many areas, but compromise solutions, varying to some extent from stream to stream, can be found. With good multiple-objective planning for each basin, our goals can be made higher than those that might be met by an often more difficult return to natural conditions.

LAUREN DALE

Julian Nowicki

Director, recreation planning branch, recreation development division, Alberta department of recreation and parks

The key issue is ensuring that recreational use of river shorelands is a primary consideration in all river shoreland planning.

Key river shorelands and their respective waterways must be protected as recreation corridors within which a multitude of water-based and land-based recreational activities can take place.

Because of Alberta's very low number of lakes, rivers and their shorelands become an attractive alternative for recreationists. Thus land use planning in Alberta must make provision for the use of rivers and their shorelands not only for trail and linear recreation-oriented activities such as kayaking, canoeing, cross-country skiing and so on but also for site-specific campground-oriented activities.

E.W. Smith

Vice-president, operations and customer services, Calgary Power

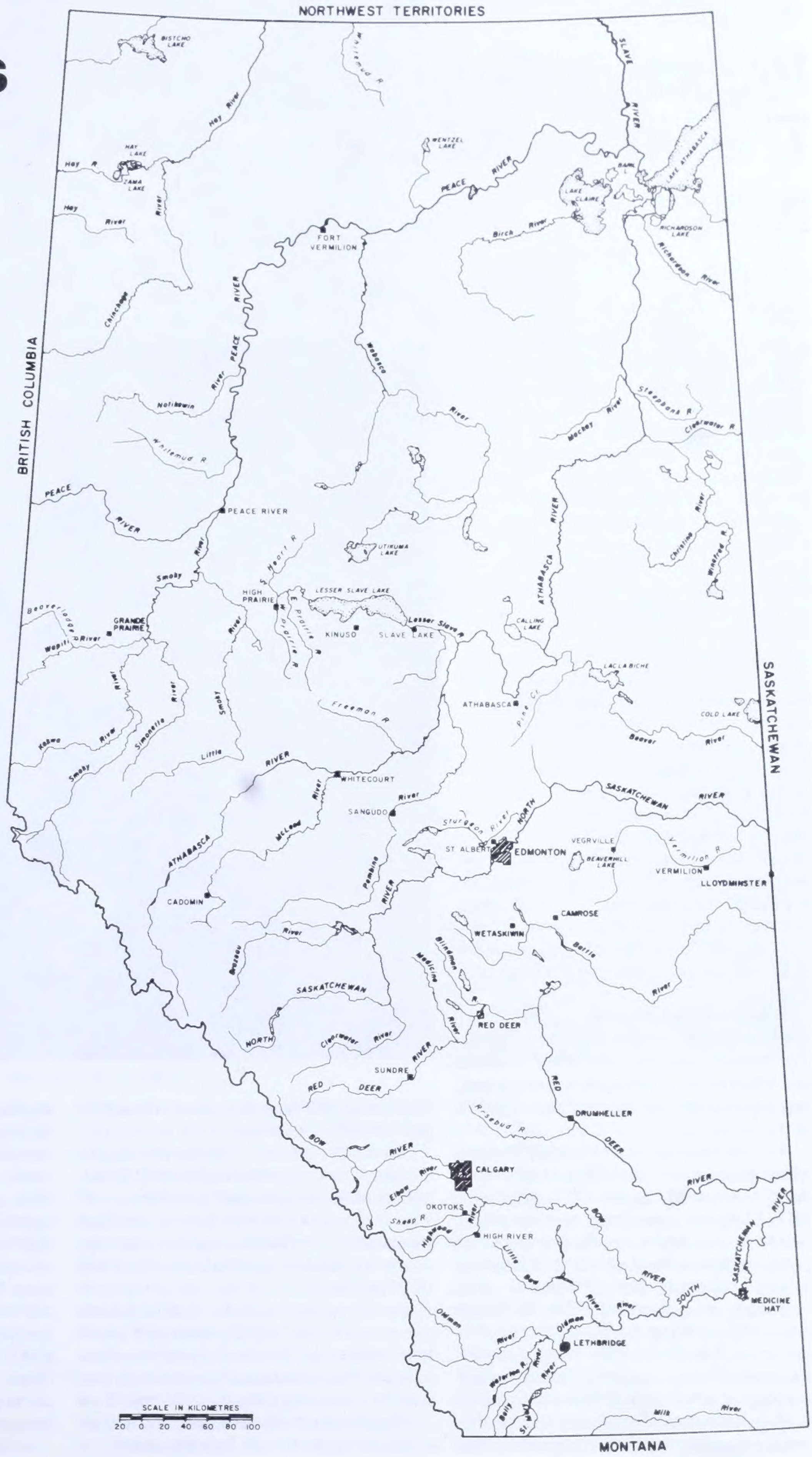
Through water rental and operating agreements with the Crown, our hydro generating plants harness the waters of these rivers to meet a significant portion of the province's electric energy requirements. The key issue from Calgary Power's perspective, by virtue of our historical existence on a number of Alberta's major rivers, is therefore "shoreline management in the public interest."

River shoreland management implies a need for Crown control of this valuable asset. This control can be achieved through regulation over all shorelands, whether they be privately or publicly owned, to enable effective long-range planning in the public interest, considering safety, liability and enjoyment.

With the increasing demand for attractive recreational lands and facilities, the company continues to evaluate proposals for the use of its shorelands that will assist in relieving this public pressure. Such proposals, however, must be in the public interest and must also recognize the company's need to protect the production of electric energy.

ALBERTA GOVERNMENT PHOTO

Major Rivers Of Alberta



Donald McMann

Preparing For The Unpredictable

Flooding caused by ice-jams is a Fort McMurray headache.

The town of Fort McMurray was built beside the Clearwater River, just upstream from its confluence with the Athabasca.

Nature had devised a plan which would normally have protected the town from flooding. The Athabasca would break up first each spring, and open the way for the later break-up of the Clearwater. As with many a good plan, however, this one had a flaw. Often ice would jam the Athabasca; the Clearwater would begin to break up, and having no place to go, would flood its banks.

Flooding caused by ice jams is unlike normal spring flooding. The latter, caused by rivers and streams swollen to many times their normal size by spring runoff, is easy to predict. The amount of snowfall and spring rain can be measured to determine, to a fairly accurate degree, the likelihood of flooding. With ice jam flooding, however, no such prediction is possible. The best the experts can do is to look at the history of a river and determine, from past events, the mathematical probability of a recurrence. But this is very imprecise; no-one really knows from one year to the next whether there will be a flood and if so, how serious it might be.

When the Clearwater does spill over its banks, Fort McMurray is often affected. Two areas of the town, the Lower Townsite and Waterways, are located on low ground, on part of what is called the "flood plain" of the river.

Fort McMurray has a history of flooding which goes back to 1835. The most serious flood to occur in the last 103 years was in 1977. That year water levels rose to a height of 248 metres above sea level. It has been predicted that a flood reaching 252 metres in height will occur once in 100 years.

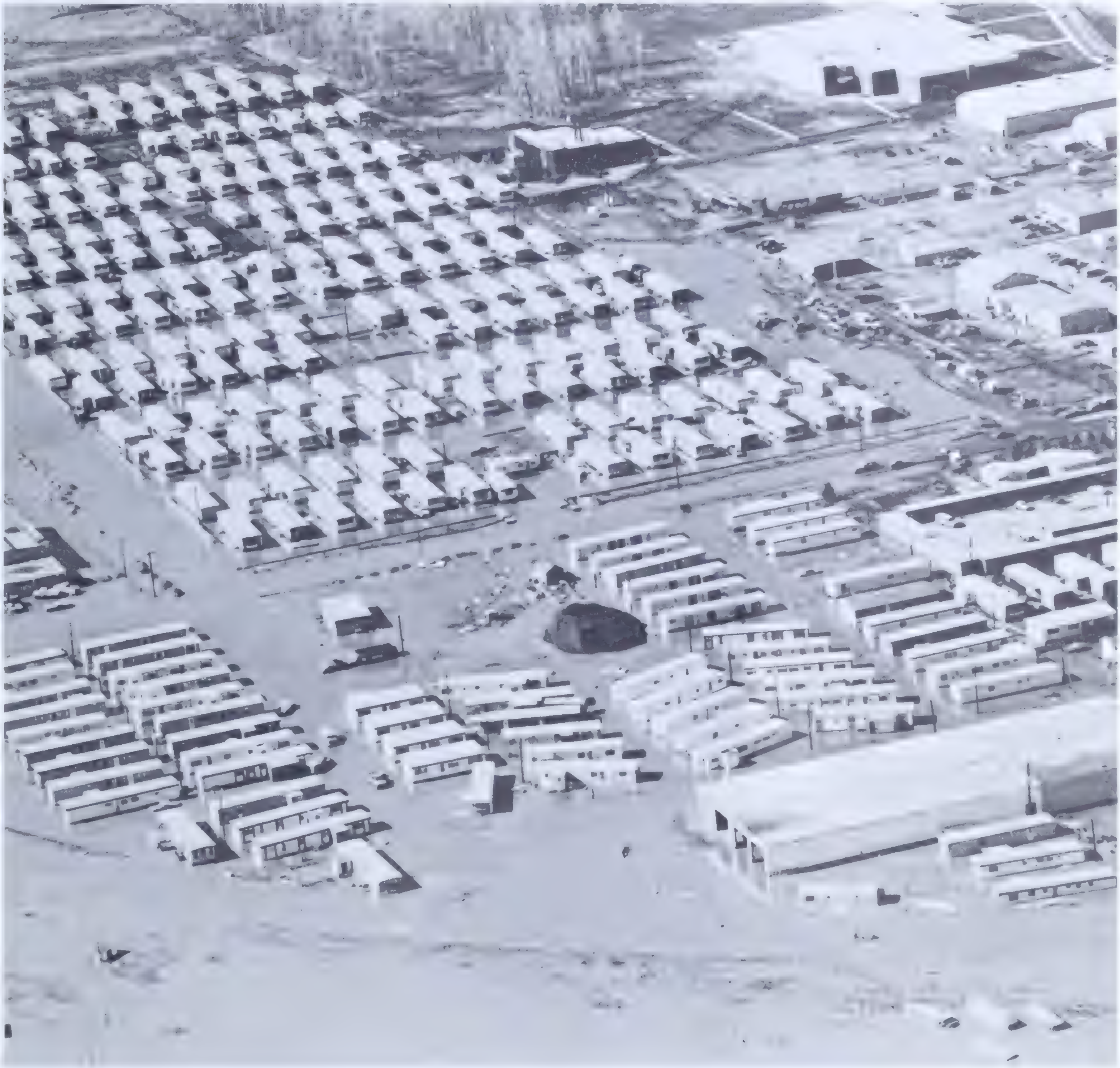
Floods are expensive. The 1977 one caused $2.6 million worth of damage. It is estimated that should 1980 bring a one-in-100-years flood, property losses would amount to some $130.2 million. Calculations indicate that if nothing is done to control the flooding problem in the town, Fort McMurray will face an average annual repair bill of $4.5 million.

With a problem of this size, it is easy to see why, in the aftermath of the 1977 flood, a study of the situation and possible ways to improve it was carried out. Recently the final report of the Fort McMurray flood damage abatement study's technical committee was made public.

Previous reports of the technical committee had looked at immediate and short-term solutions. This final report examines long-term proposals and recommends one that the committee feels would be best.

The first alternative considered is that no action be taken at all. Existing municipal regulations restrict residential building to land above the level of 248.4 metres; this means the first floor of the home is at a level which would only be reached by the water from a flood likely to occur once every 20 years. If no action were taken and the decision was made to accept the costs of flood damage, it is estimated that over 25 years some $48 million worth of damage--at today's values--would have to be borne. This amount exceeds the costs involved in flood abatement action and does not take into account the possible loss of life which could accompany a serious flood. The committee recommends against this option.

Another alternative considered was the


EDMONTON JOURNAL

Fort McMurray's 1977 flood caused damage worth $2.6 million.

careful regulation of new developments in the flood plain area. New regulations would cover land use, construction, and flood-proofing.

The committee believes this suggestion would not be sufficiently effective. It was pointed out that flood-proofing technology is limited, and that costs would not be economically justified. In rejecting the idea, the report observed that over 25 years the value gained from increased regulation would be $12 million while the costs of the program, over the same time period, would amount to $14 million.

A dike or landfill project could be constructed and would provide the community with protection against floods likely to occur only once in 100 years. This would involve a dike six metres high, having a base of 35 metres, and a right-of-way 50 metres wide. The committee suggests that this option makes sense in two important ways: it provides maximum protection at the least cost. But the committee says the risk of water overtopping the dam and the possibly resulting loss of life and severe damage to property makes this option inadvisable.

One simple but very costly proposal was the relocation of homes and businesses in the flood plain to higher ground. A look at the costs involved was all that was required to reject this choice. At present values, $380 million would have to be spent to avoid the $44 million worth of damage expected in the next 25 years.

The solution favored by the committee is the installation of either a long- or short-crested weir upstream of the confluence of the two rivers. The weir would control the movement of the ice and prevent its jamming. It looks like the alternative which would, for the minimum cost, provide the most protection and the least risk in the event of failure.

The committee has recommended that the alternative of the weir be the subject of additional study. Soon an engineering feasibility study will begin to look into site location, and design. Effects on the environment will also be examined. Should further study result in a decision to construct the weir, it would take between three and five years to complete. The report states that approximately $250,000 will be required to produce a preliminary design.

Since there will be a period of several years before any long-term solution can be implemented, the report's final recommendation is that a set of interim regulations be imposed. It is suggested, for example, that land fill be added to the banks of the Clearwater River to limit flooding effects. The installation of backwater valves in existing storm sewers is also advised. This, it is felt, would limit the flooding of low-lying areas.

Restrictions on new development are also suggested. The committee states that residential buildings should only be allowed where the elevation of the first floor is above 252 metres. The town's present regulations set the limit 3.6 metres below this, and the effect of the higher level, suggests the report, would be to restrict buildings in the risky areas to apartments and townhouses having main floor parking garages. Similar regulations are proposed for commercial developments. Only those projects which would sustain minimal damage would be permitted below the 252-metre level.

Ted Mason, mayor of Fort McMurray, says the town was involved in the study from the beginning. He believes that the weir is the "only logical way" to prevent the town's being "clobbered pretty bad."

Reaction from the public has been very favorable, he says, and no controversy has been generated by the study. The flood control measure is vital to the town not only because it will save existing property from damage, but because it will open up to development areas which have remained unused because of the regular spring floods. This will provide well-located development land and, of course, the happy prospect of an increased tax base.

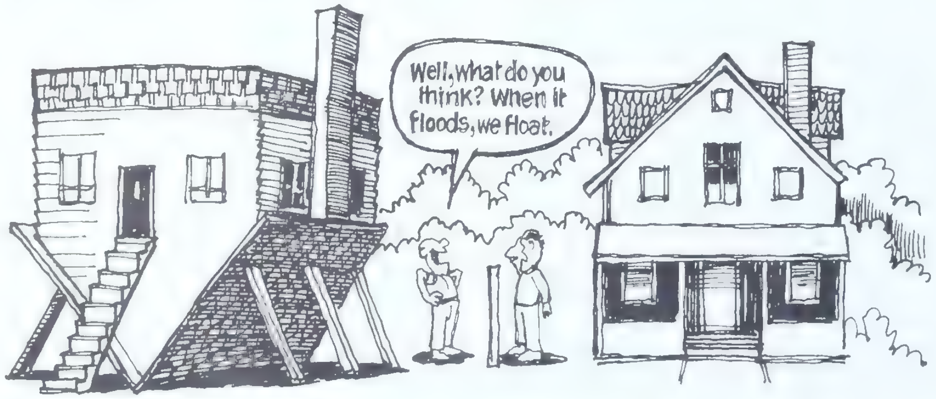
Fort McMurray is considering the kinds of interim actions it can undertake, but the mayor believes the only real relief will be from the long-term solution. He says that the backwater valves, which the committee suggests, might be of some use, but contends that the town's water treatment plant is "so vulnerable that there isn't much we can do."

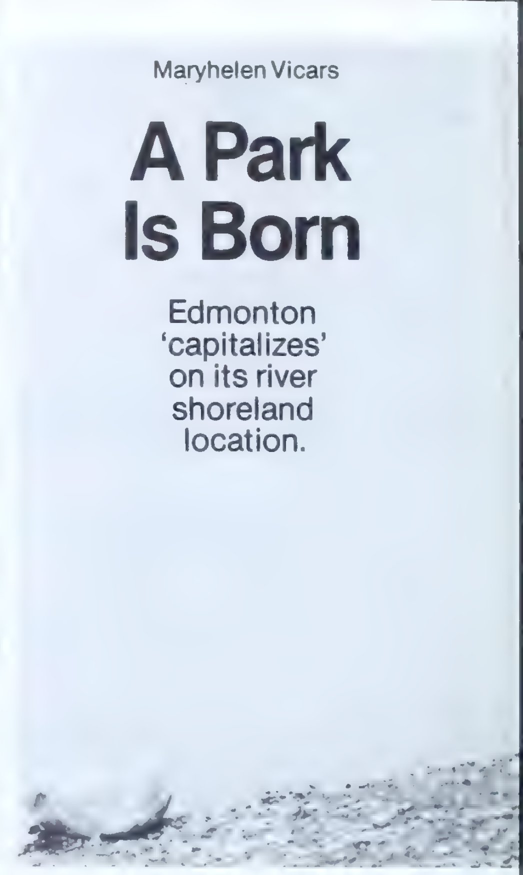
There has been some discussion as to the need for a land use by-law, but Mason claims that the existing regulations already restrict development in the danger area to a satisfactory extent.

They mayor is hoping that the engineering feasibility study will be complete by either late fall or early 1980.

Fort McMurray Today editor, Peter Duffy says that there has been very little public reaction to the proposals. The town's daily paper has received not one letter dealing with the report. It seems, at present, that whatever the government decides to do about the annual problem is all right with the local population.

Donald McMann is a journalist in Edmonton.


Well, what do you think? When it floods, we float.



Maryhelen Vicars

A Park Is Born

Edmonton 'capitalizes' on its river shoreland location.

The story of Edmonton's Capital City Recreation Park is one of more than 70 years of planning and concern for the preservation of the city's unique setting along a stretch of the North Saskatchewan river valley which encompasses 15 ravines.

The provincial park officially opened in 1978 with a system of trails and recreational facilities linking the valley's existing parks along the river valley from the Legislative grounds to Hermitage Park in northeast Edmonton.

As early as 1907, Montreal landscape architect Frederick G. Todd, commissioned by the city to design a set of parks and boulevards in Edmonton, recommended:

> *"In evolving a comprehensive scheme for parks and boulevards in Edmonton, every advantage should be taken of the great natural beauty of the situation...by withdrawing for parks purposes, property...such as the River Valley and ravines."*

The recommendation was incorporated into the 1915 city plan. In subsequent years, successive city governments have extended and refined the notion that the river valley system, including most of the ravines, should be set aside as permanent parkland.

In 1933, the system was zoned as a public park and the first set of land use regulations was established.

Despite the overall plans for preserving the river valley system for park use there had been some housing development in small

LAURENDALE

communities on the "flats", the largest of which was the village-sized neighborhood of Riverdale.

In 1951 council approved a long-term plan which called for the city to begin to buy privately-held land in the flats and to oppose most further development for the area.

The acquisition of land has continued. In a 1974 report, city planner Donald Pearson said the city owned, by that year, almost 85 per cent of the 3,200 hectares in the valley system.

In 1970 the city adopted its top-of-the-bank policy, which defined the limits of the valley system and restricted construction adjacent to these limits.

There had been relatively little pressure from commercial and industrial developers to build on the banks, says city landscape architect Rick Cloutier.

The banks are largely unstable, making construction costs prohibitive. However, Cloutier says, by the early '70s, the cost of land in the city core had escalated to such an extent that bank construction, expensive as it would have been, would have become more competitive.

The valley's status as a flood plain also helped preserve it, as developers were reluctant to risk having their projects flooded out. (In 1915, a flood covered much of what is now the Capital City Recreation Park. Pedestrian bridges in the park have been built above the 1915 flood level, so a future flood of the same magnitude would not be a threat.)

In 1971 a General Plan bylaw further refined the city's policy of dedicating the system to parks and clearly designated certain land for later acquisition.

Landscape architect Bryce Card sums up the situation of the valley system by the early '70s: the city had a master plan which tied the river valley together; it had most of the land needed for a shoreland park; and its parks planners were concerned about the need to stabilize and protect the banks along the stretches of shore between major parks.

But, he recalls, it was clear the municipal budget wouldn't stretch to the ambitious project of tying together the city's riverside parks into a major unified system.

At this point, with the 1978 Commonwealth Games on the horizon, the province stepped in.

"I would think it was the games that finally brought (Capital City Recreation Park) about," Card says. "We were getting the games and the province wanted to get some river valley development complete before the games. We had developed parks, but there was no real connection between them."

In April, 1974, after a number of meetings between provincial and city authorities, a joint announcement was made that $34 million would be made available for improvements along a 16-kilometre stretch from the city centre to northeast Edmonton.

City Commissioner Alf Savage was involved with joint policy committees from the time of the first meetings and says the project provides more than just trails, picnic areas and ponds.

The agreement, as it was ratified by Premier Peter Lougheed and then mayor the late William Hawrelak, was to provide parks and recreational facilities but, Savage says, equally important was the protection of the shoreland environment, stabilizing and reinforcing the banks which had been subject to serious erosion.

Alberta Environment hired engineer Dr. Ralph McManus as project co-ordinator, and the real work began in 1975, with the province and city working together at both policy and management levels.

During the first year or more provincial authorities and municipal authorities, with the assistance of environmental, design and engineering consultants, worked out the details of the project.

The early plans focused on the park as a kind of water-based playground and included a massive weir which would have raised the level of the river over a 10-kilometre stretch to allow for a variety of water sports.

At about the time the weir was being studied the city was considering expropriating much of the land in the flats which had over the years been devoted to housing development.

These two aspects of the park drew widespread protest from the citizens of Edmonton. Residents of the Riverdale community had been organized for some time and had been pressuring the city for assurance that

their neighborhood would not be threatened with mass expropriation.

McManus says such expropriation had never been part of the province's plans for Capital City Park; the fight was between the city and bottom-land residents.

Eventually, it was decided the city would allocate a certain amount of money each year to buy river valley land as it became available; long-term plans call for the eventual acquisition of most of the valley land now occupied by housing.

Card says it's a question now of how long the existing communities can remain viable.

"We'll acquire the land as it becomes available but no-one is talking about going down and buying up vast amounts."

He estimates the city is now spending about $2 million a year throughout the valley, which "barely keeps up with the lots as they become available."

Lynne Bioletti was one of a number of "community activists" who took exception to the weir plan. She says the hundreds of people who sat on committees, held rallies and signed petitions during the early part of 1975 were afraid with the inclusion of the weir the park plans were "getting out of hand".

They feared the weir would raise the water table, causing further instability to the shoreland.

But when the weir plan was finally abandoned late in 1975, McManus says, it was because consultants concluded the water quality was too poor for safe boating.

Instead the budget was rewritten to incorporate most of the weir's costs in improved trails and pedestrian bridges and in the construction of a fresh-water lagoon system in Rundle Park.

In 1976, McManus says, a total of 20 contracts were let for bank stabilization, landscaping and the construction of trails, bridges, overpasses and picnic shelters.

The project was all but completed by the gala official opening July 9, 1978, with the Strathcona Science Park the only major project not yet finished.

This will be located opposite Rundle Park and will include exhibition areas highlighting the natural resources of the province, as well as a ski area with T-bars, rope tows and cross-country trails.

Cloutier attributes the building of the park to more than the desire to create a Commonwealth Games showpiece.

"The public's values changed in the mid-'60s," he says. "People became more interested in recreation, especially outdoor recreation. As we moved into the '70s the public also became more interested in fitness."

These attitudes, he says, created pressure on governments to create outdoor recreation areas to accommodate these new interests in jogging, hiking or Nordic skiing.

In the North Saskatchewan river valley, the city had an undeveloped area which had been used for outdoor recreation for years.

Cloutier speculates, and others involved in the project agree: "The provincial government saw an opportunity to fix the land permanently as parkland through the development of trail linkages and new park spaces."

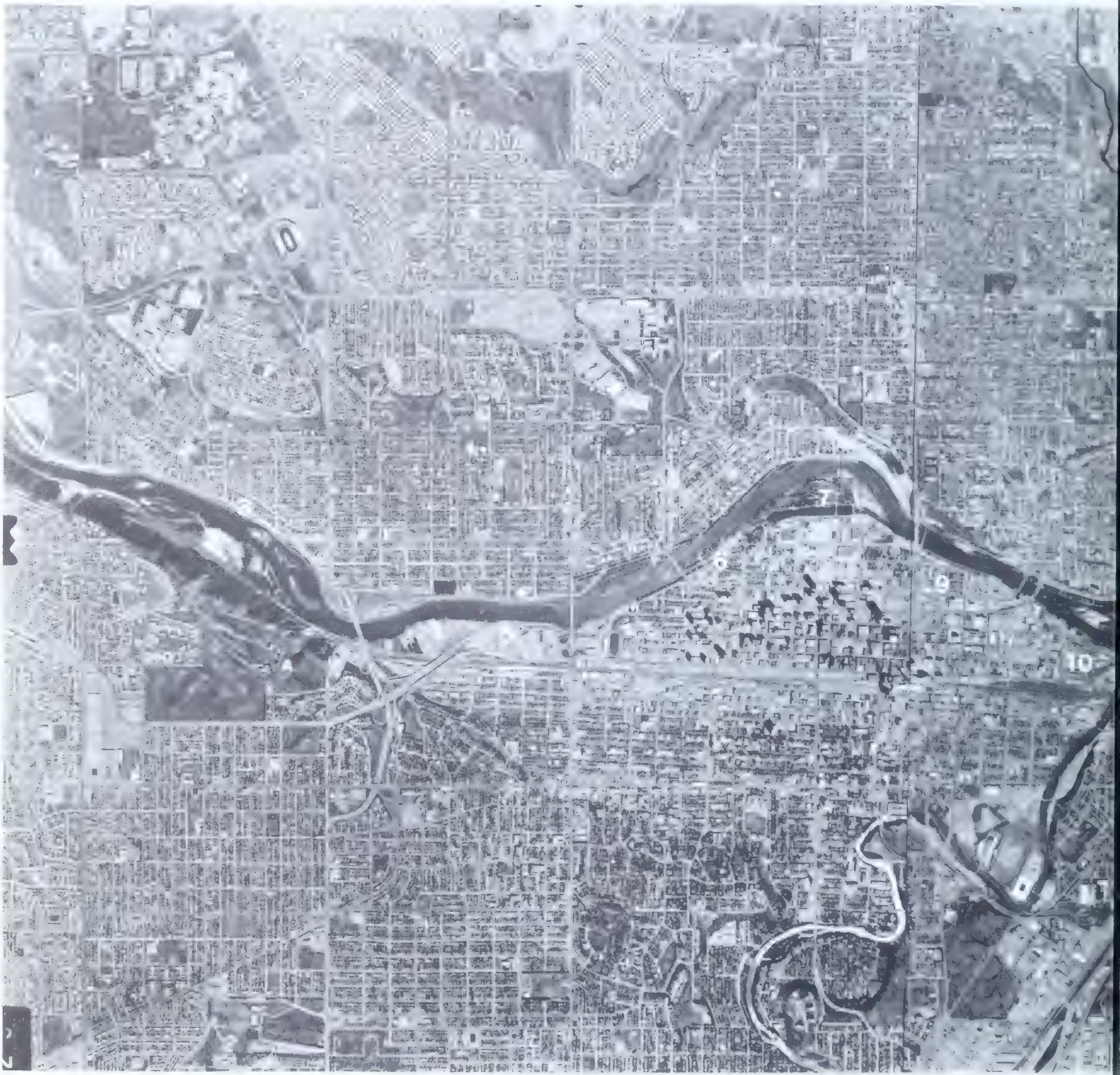
Now, park planners are looking south and west, as they consider a possible expansion of the park to the city's western edge.

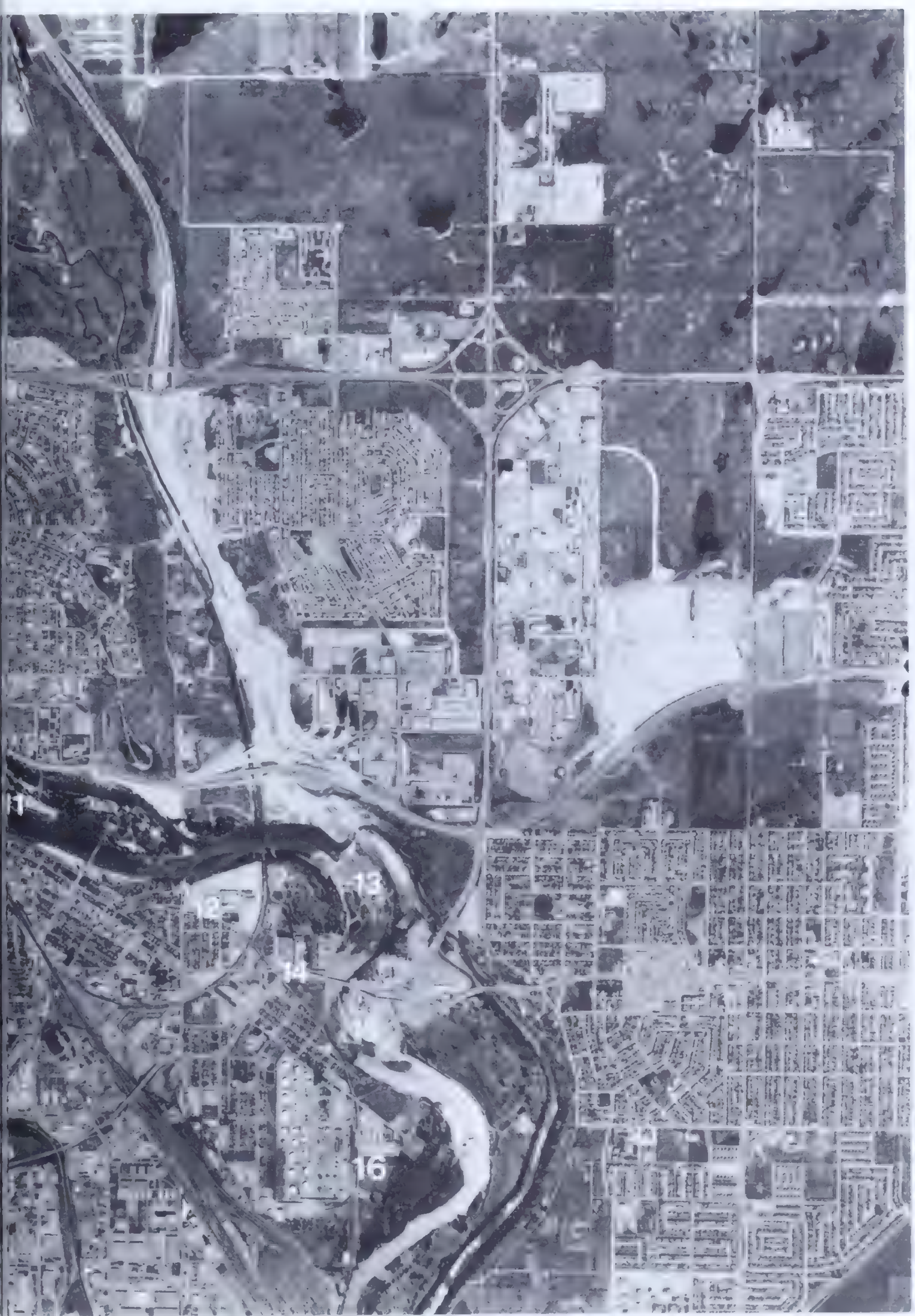
Maryhelen Vicars is a journalist in Edmonton.

LAUREN DALE

Down By The Riverside

A short stretch of the Bow River
through Calgary shows a lot happening.





ALBERTA GOVERNMENT PHOTO

1 Former drive-in theatre, now the site of a major condominium and apartment complex.

2 Lawrey Garden -- at one time a low-density residential area, purchased by the province due to major winter flooding problems. Used for a gravel pit and recently reclaimed for future use as a park.

3 Transportation corridor -- Memorial Drive.

4 & 5 Used car lots.

6 Park.

7 Prince's Island Park -- major landscaped area.

8 Eau Claire Estates -- presently scheduled for major development, office towers, apartments, hotels, etc.

9 Site of the federal government office building nearing completion.

10 Fort Calgary site -- former site of auto wreckers and warehouses. Recently redeveloped as a historical park, site of the original Fort Calgary.

11 St. George's Island and Centennial Park -- site of the Calgary Zoo.

12 Con Force Ltd. -- industrial development manufacturers and storage of precast concrete units.

13 Deerfoot Trail -- major transportation corridor.

14 Industrial site -- steel fabrication and outside storage.

15 Former concrete pipe manufacturer's plant, recently redeveloped as part of the Inglewood Golf Course.

16 Inglewood Bird Sanctuary -- preserved natural area.

Kathy Kennedy

Floodwaters Ebb, Problems Remain...

And Vermilion River shoreland users disagree on solutions.

The Vermilion River burst on to newspaper headlines in 1974 when flooding caused extensive damage to roads, bridges and homes in the east-central Alberta river basin, even forcing the evacuation of some Vegreville hospital patients.

As the water ebbed, so did public awareness of the river-related problems. But the two big headaches that have plagued basin residents since settlement at the turn of the century--flooding and poor drainage--remain.

And they have historically complicated the planners' task of reconciling the needs of various shoreland users, including farmers, recreationists and waterfowl.

For example:

- A dam built in the Two Hills area to improve waterfowl habitat upstream (also to store cooling water for a thermal plant) caused complaints of increased flooding and siltation by upstream farmers;
- Control of water levels to accommodate recreation on the reservoir behind the Vermilion Dam resulted in an outcry by downstream farmers who claimed their hay bales were being washed out by the release of water from the dam;
- Would-be swimmers and boaters complained of poor water quality, partly from animal wastes washed from shoreline feedlots;
- Dredging and channelization to improve the flow of water off farmers' fields has caused concern among waterfowl enthusiasts about eliminating important nesting and staging areas for shorebirds.

There have been improvements over the years, particularly as farmers, wildlife agencies and government officials have opened up new channels for communication. But problems--and bitterness, especial-

Dike construction to protect Vegreville's hospital (left). Vegreville homes surrounded by water after the 1974 flood (below).

Flooding of the Vermilion River near Two Hills (far left).

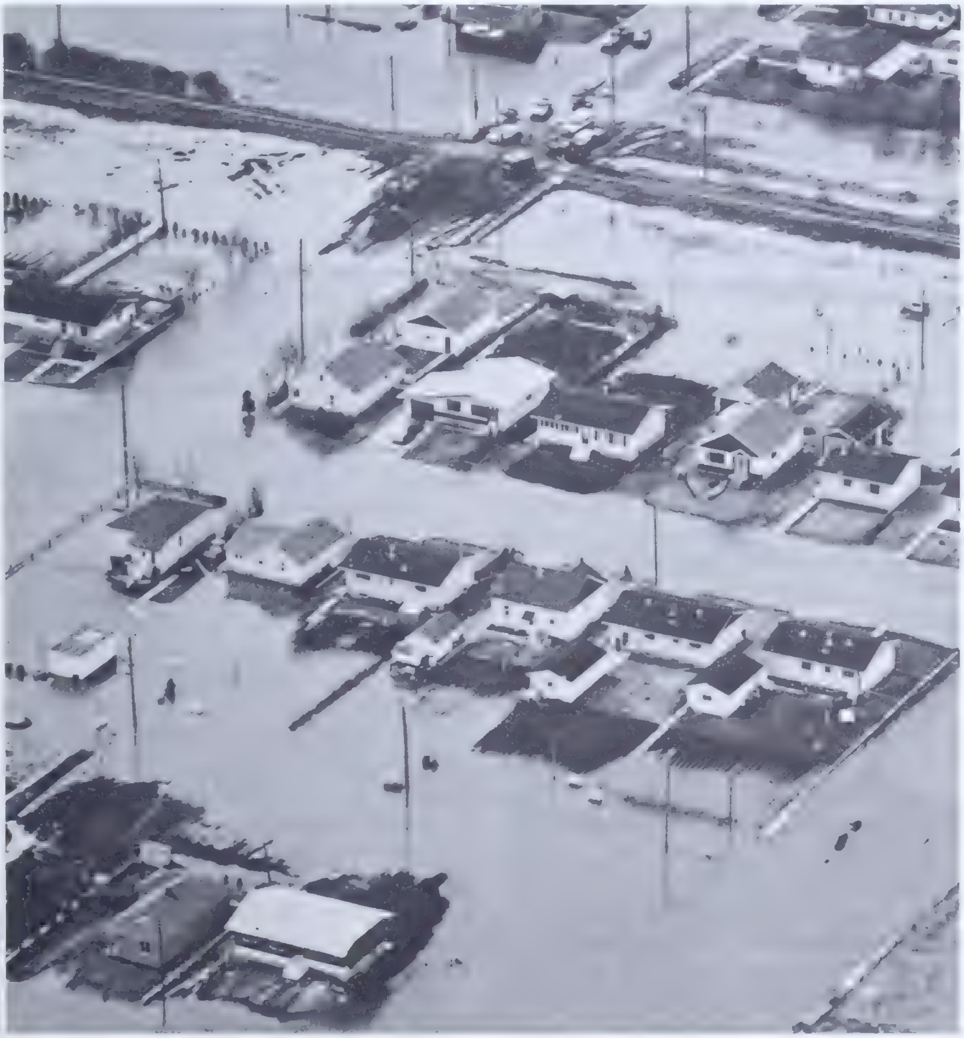
ly among some long-established farmers--still exist.

The Vermilion River flows for about 350 kilometres, passing Vegreville, 90 kilometres east of Edmonton, Two Hills to the northeast and Vermilion, about 60 kilometres from the Saskatchewan border, before joining the North Saskatchewan River about 25 kilometres from the border.

The river consists largely of five plateaus with only small gradient drops in between. The Two Hills and Vermilion floodplain areas are extremely flat, with the area at, and below, Vegreville only slightly less flat; the region is ripe for flooding and slow to drain.

By far the greatest flood damage is to native hay crops, which farmers harvest to supplement their mixed farming activities. An annual spring flood is necessary to the hay's growth, but when it is prolonged--or followed by unexpected summer and fall inundation--farmers are unable to work the area and may suffer economic hardship.

"A lot of oldtimers say the dams created the (flooding) problem, and they did," says William Walker, Jr., who farmers 480 hectares just five kilometres downstream of the Vermilion Dam. From 1954 up to two years ago, when the water level at the reservoir got too high for maintaining the swimming and beach area, "stop logs" or planks were pulled from the dam, flooding downstream fields, he continued.



EDMONTON JOURNAL

"You'd just get your hay swathed, and next thing you know, there's three feet of water out."

Walker now is part of a four-farmer delegation which makes farmers' concerns known to government, meets with representatives of the various departments and keeps local residents informed about government plans and policies. As a result, he said, farmers now are given the annual spring flood for their hay crop, but water is not released from the dam at inopportune times.

Some farmers still think water is being released from the Vermilion and Morecambe (Two Hills) dams, admitted Walker.

"There is a little bitterness, and I can't blame them," he said, citing past difficulties in communicating with officials and claiming inconsistencies in the way compensation has been paid for crop damages. Walker himself believes current flooding problems are caused by beaver dams and heavy rainfall as well as the accumulation of silt in the river.

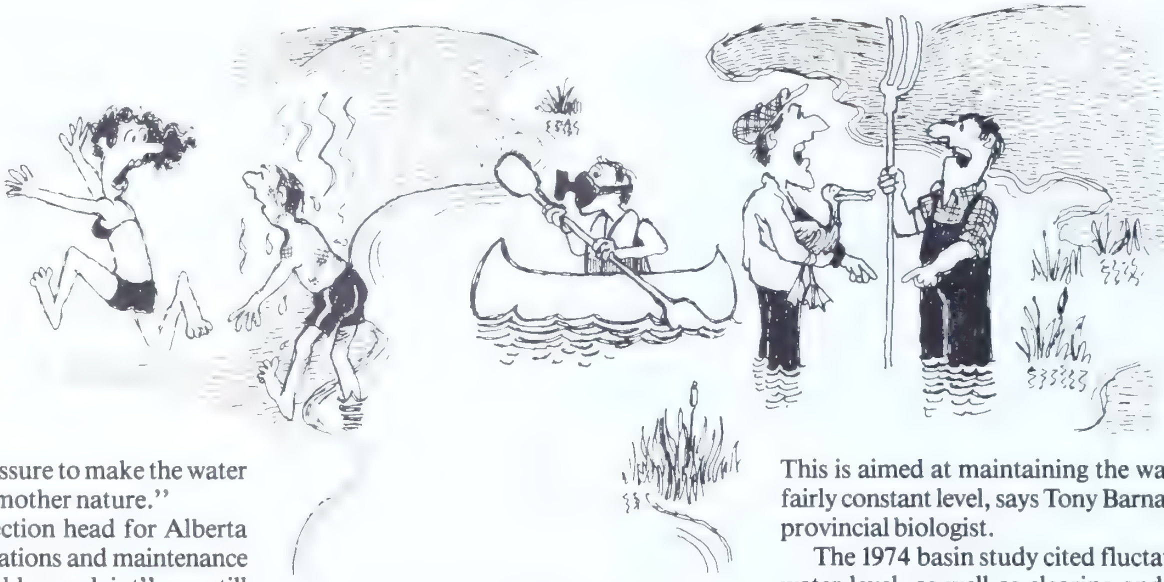
Don Kennedy, who farms 35 kilometres downstream from the Vermilion Dam, said in an interview that two-thirds of his 270 tonnes of hay, as of mid-July, were under water partly as a result of "dumping water out of Two Hills (the Morecambe Dam)."

In addition, the failure of the Vermilion Dam late this spring flooded his hay flats, and there are still wet spots preventing him from working the land, he said.

Last fall he was baling straw when the water began rising, and "had to go all night to move the bales (away from the river)."

"The environment department said it was rain, but it couldn't have been, at the speed at which it came. The water doesn't rise a foot in a day.

"There shouldn't be any water control structures on this river, because there's (virtually) no drop in the river. When a dam is



there, there's no pressure to make the water run. You can't beat mother nature."

John Klassen, section head for Alberta Environment's operations and maintenance branch, said the "odd complaint" was still coming from farmers who insisted upstream structures were being opened.

The Morecambe structure was only opened once this spring so a lake wouldn't build up behind the dam and be slow to drain, he said. The Vermilion Dam is opened "if we know there will be heavy runoff...but the water would go out regardless."

Kennedy also complained that the quality of river water was "a joke."

"It ain't fit to swim in...cattle won't even drink it. It's full of manure from feedlots, and (human) sewage too."

This poses a problem for those who wish to use the reservoir, around which Vermilion Provincial Park is built, for boating, swimming and water skiing.

A spokesman for Alberta Environment's municipal engineering branch said sewage treatment facilities in the larger municipalities bordering the river had been upgraded in the last five years. Stu Duncan, regional director of agriculture at Vermilion, said he thought there had been "considerable improvement" in the feedlot waste problem, although "some farms bordering on the river valley would have to move their entire facilities for a total correction."

However, Arthur Anderson, park ranger in charge of Vermilion Provincial Park, said water samples taken by an inspector from the Minburn County health unit, and tested by the Alberta Environment laboratory, showed high enough concentrations of the types of bacteria indicative of animal and human wastes to cause the water to be unfit for swimming. The inspector, though, did not have the authority to close down the swimming area and the report was sent to the regional parks office for further action.

Failure of the dam this spring has considerably lowered the level of the reservoir, added seasonal ranger Gary Hellinga, and canoeing is the only viable water sport at present.

The Vermilion River Basin, according to a 1974 report of Alberta Environment's planning division, provides "excellent waterfowl habitat for breeding birds, and there are major staging areas during fall migration."

The best waterfowl habitat lies in the chain of eight lakes in the Two Hills floodplain area, primarily Bens Lake and Watt Lake. Just last month the public lands and wildlife department, in conjunction with Ducks Unlimited (DU), released about 200 Canada geese into Bens Lake to further enhance that waterfowl population.

But here again lie conflicts--or at least potential conflicts--with agricultural activity along the river. In general, draining, clearing and cultivation of land to the edges of a river destroy natural food sources and nesting cover. On the other hand, waterfowl may eat the grain off farmers' fields and cause considerable losses.

Ducks Unlimited, a private, non-profit conservation group engaged in water management projects for providing waterfowl habitat, built the original Morecambe Dam in co-operation with Canadian Utilities (Alberta Power) in 1950. The dam, however, was never licensed and, after many upstream farmers complained of increased flooding and siltation, it was partially dismantled in 1955, with the remainder removed by Alberta Environment in 1973.

However, following release of the Vermilion River Basin Study, Alberta Environment embarked on a water management program which included replacement of the Morecambe structure to control water levels in the Vermilion Lakes, and the new dam was installed three years ago.

Ducks Unlimited has also funded a water control structure on Bens Lake, which permits water to flow into the lake up to a certain level, then diverts the rest straight down the river system without going through the lake. This is aimed at maintaining the water at a fairly constant level, says Tony Barnard, DU provincial biologist.

The 1974 basin study cited fluctations in water level--as well as clearing and the removal of trees--as factors with the greatest effects on waterfowl populations.

DU has also built 18 nesting islands and four "loafing bars" on Bens Lake to improve habitat, said Barnard.

Watt Lake has nearly the same waterfowl potential as Bens Lake, said Barnard, but DU hasn't become involved here because of disagreement among lakeshore landowners about the most desirable lake level.

Lawrence Hermanutz, Edmonton regional administrator for Alberta Environment's water resources management division, explained that the land around the lake was all privately owned, and that "the farmers want the level low so they can farm as much as possible, while the waterfowl people want it higher."

Dave Barton of Alberta Environment's planning division, along with farmer Walker, sees problems in planning--or lack of planning--for the river basin.

"If something is done at one of the five plateaus (in the basin), it just drops the problem to the next plateau," said Barton. "Efforts to address problems have been too localized and haven't been concerned with what happens downstream."

Says Walker: "The top end of the Vermilion River has developed first, and we (downstream) are left with all the problems. They pull planks from the dams upstream and we get the flooding."

But there's hope for future developments in the basin as a result of a recent request by the agricultural development committee for the County of Minburn, said Barton.

The committee has asked for a joint agriculture-environment department "drainage feasibility study" of some 1,870 square kilometres of the Vermilion River Basin. Such a study will "force us to look at the whole length of the system," said Barton.

Kathy Kennedy is a journalist in Edmonton.

Myron Rockett

For wildlife, river shoreland development may mean

Invasion Of The Last Refuge

ALBERTA GOVERNMENT PHOTO

In a wealthy province, businesses boom, cities grow, the push to discover more energy resources goes on at a great pace. Such development puts pressure on land, and the price that may be paid for it is another valuable resource--wildlife.

Diminishing wildlife habitats are not a new phenomenon. Bruce Stubbs, a habitat protection biologist in the department of energy and natural resources, notes that agriculture, ranching and other land uses have meant the gradual clearing of most land, especially in the southern part of the province where the best agricultural land is.

The effect of this land clearing has been to cause wildlife to retreat to the few remaining areas offering cover, food, and the peace and quiet needed to raise young--river valleys.

Even before man cleared the land, the rivers have been important to most forms of wildlife at some stage in their life cycles. In Alberta, says Stubbs, river valleys and shorelands serve as ranges for just about every type of mammal and bird, and the degree of reliance and purpose for which they need the rivers are very diverse.

Waterfowl, such as geese, use the islands, sandbars, and shores of rivers along flyways as resting and feeding areas while travelling to and from the far north. Colonial nesters like herons rely on islands and sandbars for breeding grounds and demand a quiet, undisturbed environment to raise their young. Other birds such as eagles and hawks generally prefer to build their nests near shorelands.

Animals like beaver and otters build their homes right on shorelands and depend on the rivers for their entire life cycle. Most larger animals spend much of their lives in river valleys; some, like the moose, depend on shorelands for a food supply. Predatory animals like the fox and coyote also prefer to hover around river valleys because of the more abundant game and thick cover.

During the summer months many animals wander about the parklands or prairies. Food is more easily found, and even cleared land offers some cover in the way of small bluffs of bush or hedgerows. But when winter comes, the food and cover offered by these bluffs is no longer sufficient. Foraging for food is much easier on the river valley slopes because the snow is generally thinner. According to Stubbs, the slopes, particularly south facing, are much warmer due to the angle of the sun. By spring, even in the valleys, food will be hard to find. But snow on south-facing slopes melts much sooner than the surrounding area, and it is here that the first growth of spring will be found.

Until recently, most forms of wildlife have been safe in their river valley refuges. River valley land had been considered unprofitable for most other uses. Land was available elsewhere for agriculture, sand and gravel could be obtained in more accessible locations, and the rush for waterfront cottages or acreage sites had not begun.

Now it's a different story. Developers are showing more and more interest in river valleys as land in other areas is taken up. Wildlife are being threatened even in their refuge of last resort.

Throughout Alberta four major activities are rapidly consuming vital river valleys and leaving wildlife homeless. These activities are livestock grazing, subdivisions, sand and gravel operations and dam construction. What each activity does to the environment, how it affects wildlife, and possible solutions to ease the threat, can be considered in the context of four rivers.

Stubbs describes the *Peace River valley* as "one of the worst areas in Alberta for over-grazing."

"Livestock have been allowed to over-graze the valley slopes for many years and the long-term effects of this poor management have been apparent for some time now," he says.

All along the valley over-grazing is standard, he notes. In some areas severe over-grazing is a common practice.

The importance of the Peace River valley to wildlife is very great, says Stubbs. The area is a natural habitat for just about all large animals commonly associated with parkland and forest regions. Everything from deer and moose to bear are common here. Agriculture has cleared the land right to the crest of the valley slopes along parts of the river, driving wildlife into the valley. Livestock grazing in the valleys soon followed, with food sources and protective cover being eaten up and trampled. The question now is where are the wildlife to retreat to?

When an area is over-grazed almost all foliage is stripped from the ground, and the hooves of large numbers of cattle trample and pack the earth further, stunting and even killing the roots of plants. Erosion quickly sets in on steep slopes as vegetation dies off. Both the roots and the shielding effect of the leaves play a major role in preventing spring thaw and summer rains from washing soil downhill. Once the top layer of life-giving humus is washed away, it will take many years for any sort of vegetation to begin growing again. And badly eroded land is useless, not only to wildlife, but to cattle as well.

Both the best interests of wildlife and cattle can be served by the regular rotation of cattle herds from one pasture to another, and old pastures being allowed to recover from use, says Stubbs. Cattle should not be permitted to graze on slopes in spring until the new grasses have had a chance to become well established. Salt licks should be placed away from the water's edge so as to prevent a concentration of cattle in one place. If the salt lick is away from the water, the cattle will spread out as they travel to and from the lick, causing less trampling. These measures would greatly reduce the destruction of vegetation and subsequent erosion; in this ideal situation, cattle and wildlife would not threaten each other.

The *Smoky River* in western Alberta is among the most important habitats in Alberta, according to Stubbs. He notes that "virtually every type of wildlife found in Alberta can be found along the course of the river."

This enormous wealth of wildlife is being threatened by a chain of sand and gravel mining operations.

These operations have one devastating effect on wildlife, says Stubbs; almost no vegetation grows in an unreclaimed gravel quarry, making it unusable as a habitat. A few of these barren pits aren't going to cause much of a problem, but vast stretches of heavily grazed ranching land interspersed with open gravel pits, as found in the Smoky River valley, could, he says, mean an end to wildlife in the area.

Stubbs points out that the threat to wildlife in the Smoky River valley and similar regions could be substantially decreased by reducing the number and controlling the spacing of pits, and restricting the establishment of new gravel quarries. Rather than each community, municipality, and private interest having its own pit, a few large pits should be used to serve all interests.

The bear says he and his pals are staging a sit-in in our barn until we give them back their river valley!

The *Red Deer River* is surrounded by agriculture up to the banks of the river valley slopes. This valley is important to wildlife of the deer family and all types of smaller animals, as well as waterfowl. Wildlife of this river valley area are threatened by the proposal to build a dam on the river. The dam would result in the valley above the structure being flooded almost to the crest of the valley slopes. "This flooding is a simple removal of a habitat in its entirety," said Stubbs. If the valley were flooded, wildlife from this section of the river would be hard pressed to find new ranges amid vast expanses of wheat fields and open pastures.

The *Oldman River* is surrounded to the banks of its valley by agricultural land. The wildlife in this area also have no alternative habitat to the river valley.

Stubbs points out that subdivision of the Oldman River valley slopes for acreages is becoming an increasing threat to wildlife in the Lethbridge area.

Acreages bring large numbers of people into an area on a regular basis, resulting in the harassment of wildlife. Along with the people come noisy trail bikes, snowmobiles, and boats. Stubbs stresses that the tremendous increase in human activity, especially that of people inclined toward the frequent use of motorized recreational vehicles, cannot be tolerated by most wildlife.

He adds that most acreage owners waste no time in clearing up the undergrowth about their land and along the river shores. This "clean-up" removes the dense cover that wildlife require to raise their young and avoid predators. With the noise, activity, and clearing of undergrowth that subdivisions bring, wildlife are forced to seek out new habitats. Chances are the only ones these wild refugees will find will already be occupied by other wildlife. If the area becomes overcrowded, starvation and death may result when the deep snows and the cold of winter set in.

Myron Rockett is a journalist in Edmonton.

Gillian Sniatynski

What If The River Rises?

The city of St. Albert responds to a flood plain study.

LAUREN DALE

On January 14, 1861, a young Roman Catholic priest and his bishop were travelling from a mission at Lac St. Anne to Edmonton.

The priest wanted to relocate the mission, and was anxious to show the bishop the site he had in mind. They stopped on a hill overlooking the Sturgeon River.

According to one account, the bishop was "awed by the beautiful scenery." He stuck his cane into the snow bank and said to the priest, "This will be the site of your new mission and I will name it after your patron, St. Albert."

The priest was the legendary Father Lacombe, the friend and supporter of Indian and Metis people and, as it turns out, the founder of Alberta's eleventh city--St. Albert.

The city's river location, important for aesthetic as well as practical reasons when it was first established, is still an important factor in its development today.

The homes and businesses which sprang up along the Sturgeon over the years now form part of a flourishing, growing community of 24,000 people. And it's safe to assume that when Father Lacombe allocated to early mission settlers the long, narrow river-front lots that were then common in his native Quebec, he had no idea that same land would be so valuable, more than 100 years later.

The value of the land, and the history which lay behind its development, acquired special significance when, in 1975, Alberta Environment completed a flood plain study on the Sturgeon River through St. Albert. (See box for more about flood plain studies.)

The results may have had some city officials and planners scratching their heads. Why? The "one-in-100 years" flood level--the level below which permanent development is considered undesirable--encompassed most of the downtown core!

So, theoretically, that core could expect to be inundated once every hundred years (or so). Today, it's unlikely that such development in a critical flood plain area would be permitted. But the bad news came more than 100 years too late for St. Albert.

That's not to say the study wasn't taken seriously. Shifting the downtown core was obviously too impractical--but the city's planners still felt it was worth taking heed of the warning.

Some land on the north side of the river is privately owned--the city can do nothing to protect the houses built within metres of the water. But where protective "floodproofing" could be introduced, it was.

The flood plain study set the 100-year flood level at 2,143 feet (650.04 metres) above sea level. So on the south bank of the river, adjacent to the downtown area, berms to a height of 2,150 feet (652.16 metres) were built. Theoretically, by creating a new, artificial river bank, they could contain even a 100-year flood.

The city intends to complete berming on both sides of the river, for total flood protection.

Also included in St. Albert's general plan is the concept of a parkway corridor within the Sturgeon River valley. The plan states that "within existing boundaries, the city has acquired ownership of almost all lands within the Sturgeon River floodplain and will continue to acquire such lands in an effort to secure a continuous linkage of park space along both banks of the river." The plan further notes that "judicious urban planning will ensure that this heritage is safeguarded."

Work on the parkway corridor--called Red Willow Park--has already begun, with berming included in an overall plan of landscaping.

The city's general plan takes heed of the flood plain study in another way by designating land below the 2,150-foot contour as generally undevelopable and subject to dedication to the city by developers.

An exception is a new shopping centre and condominium complex now being constructed on the north bank of the river. In some places the development comes within about 15 metres of the river--and hence at an elevation to bring it within the critical flood

Gardens run almost to the water on the Sturgeon's north bank (above).

Tree-planting and footpath construction for Red Willow Park (below).

The Sturgeon flooded campgrounds in 1972.

EDMONTON JOURNAL

LAUREN DALE

zone. So fill has been used to alter the river channel and mitigate the flood threat.

What evaluation could be made of St. Albert's flood protection measures? Officers in Alberta Environment's river engineering branch agree that, as structural solutions, berms and landfill are fair enough in the short term. But they question whether the structural solution is necessarily the best, long-term.

Harvey Rickert of the river engineering branch notes that both measures have the effect of altering the natural floodway of the river--so downstream and upstream effects of increased water levels and increased velocities are inevitable. It also takes time to assess combined effects of a couple of floodway-altering measures--a problem when, often, quick answers are called for.

Flood plain studies are the business of Alberta Environment's river engineering branch. The studies are being carried out on a priority basis on rivers across the province.

The aim of the studies is to determine which parts of a river's shoreland are likely to be inundated by floods of different frequencies.

The areas generally considered critical are those which would be flooded on the average once every hundred years. Infrequent as this may seem, it's judged a sufficiently great risk to make development of any permanent kind inadvisable.

Flood plains are charted on the basis of a variety of information. The river engineering branch's work is made much easier in cases where accurate records of floods have been kept. The Water Survey of Canada or the bridge branch of Alberta Transportation may have the needed information. Otherwise, archives may be tapped, oldtimers consulted, and historical high water marks on buildings examined. This gives water levels for various flood events. In addition, hydrological analysis of available river data is made to determine flood frequencies.

Complex hydraulic data on the river itself and its channel characteristics are also gathered. All the information is analysed by computer to determine flood elevations. Obviously, the better and more up to date the information fed in, the more accurate is the engineer's prediction likely to be.

Dave Andres, an engineer with the river engineering branch, notes that a flood plain study can cost around $30,000. And given both surveying and engineering time, it can take up to a year to complete.

Ronald J. Middleton

The Good, The Bad And The Ugly?

Among options in river management, aesthetic and environmental considerations need not be overlooked.

Take a small, meandering stream overgrown with willow and teeming with wildlife. Throw in some consideration of its flood or drainage problems. Add in a solution–perhaps in the form of channel improvements such as those carried out on the East and West Prairie Rivers and Namepi and Kennedy Creeks for just such problems.

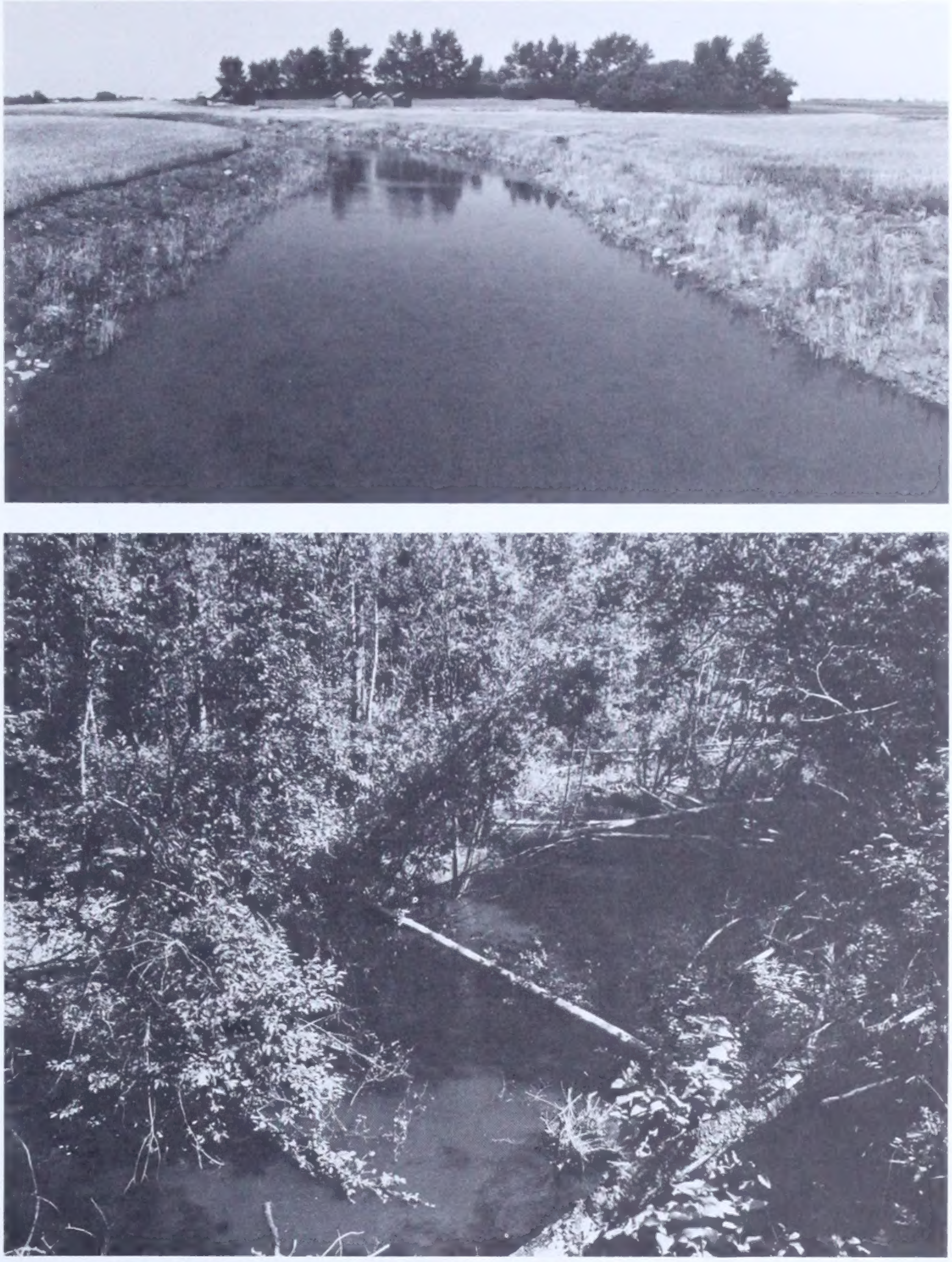
What do you get? Sometimes, unfortunately, a stream that now looks more like a big open ditch running through a devastated right-of-way 100 metres wide. The dilemma facing shoreland planners boils down to a trade-off--what sacrifices must be made in the interests of river management?

Channel modifications, like most water resource management projects, are undertaken in response to stated problems.

There are a limited number of alternatives available to planners and designers dealing with a flooding problem. One approach is to leave the river itself untouched and to attempt to reduce the amount of damage through land use restrictions, or to alleviate the hardships of flooding through compensation or insurance schemes. Despite sometimes compelling economic arguments in favor of such non-structural solutions to flooding problems it is unrealistic to believe they will become common in the near future.

In some cases flooding problems have been caused or aggravated by factors beyond the control of the flood victims; the suggestion of altering their land use or accepting compensation for their losses is considered no solution at all. In other cases the social benefits of maintaining or enhancing a land use in an area is considered important enough to justify the extra expense of a structural solution (this is part of the justification for the plans to stabilize Lesser Slave Lake).

Once a structural solution to a flooding problem has been decided upon the only real alternatives are either to reduce the peak flow in the river or to direct or confine the water to reduce damage. Flows are generally regulated through the creation of impoundments that capture and store water during periods of high flow and release it gradually over a longer period of time (such a reservoir is proposed for the Paddle River near Mayerthorpe). Such reservoirs are accompanied by many environmental issues. Sufficient to say that it is one alternative that exorbitant expense or lack of suitable sites often rules out.



LAUREN DALE

Effects of channelization (top); a natural stream environment (bottom).

This leaves only the alternative of attempting to direct or confine the flood waters. However, within this alternative are a whole range of options varying from "hard" to "soft". "Hard" in this case refers to the approaches least natural and sensitive to environmental values, and "soft" to those approaches which attempt to preserve the natural and aesthetic characteristics of the river while achieving an acceptable solution to the problem.

The "hardest" solution to the problem would be to direct the entire stream into a pipe and bury it. Although an expensive solution and drastic in terms of environmental and aesthetic consequences, its effectiveness cannot be questioned; this has been the fate of many streams in urban areas.

The channelization already mentioned is a more widespread approach. In this case the river's capacity (the volume of water it can carry in a given period of time) is increased by removing obstructions, and straightening, widening, and deepening the channel. Unfortunately, in carrying out this work, fish and wildlife habitat is eliminated, recreation potential severely restricted, and the beauty, variety, and intimacy of the river destroyed.

In addition to the obvious destruction, drastic channel modification often results in problems both upstream and downstream of the work. While alleviating flooding in the channelized reach, it increases the intensity of flooding downstream. As well, straightening a channel increases its gradient and consequently its erosive force. This can result in increased erosion upstream, maintenance problems with the channel itself, and increased amounts of sediment being carried downstream.

A slightly softer approach might still entail the construction of a wider, deeper channel but one which follows the existing river course as closely as possible. This would still destroy a great deal of valuable habitat and vegetation, but would maintain at least some of the natural character of the river and lessen the upstream and downstream effects.

A third and still softer approach would be to leave the stream's natural channel untouched as far as possible and to build an adjacent or nearby second channel that would carry only the flood flow, and be dry the vast majority of the time. Thus, most of the time the river would follow its natural course, much of the adjacent vegetation would be saved, and the natural character of the river and its shorelands would be preserved. Where the channel can be directed into an area that would not be seriously damaged by the extra water, as has been done with Sawridge Creek at High Prairie or is proposed for Swan River near Kinuso, this "flooding" alternative can be a highly successful and environmentally sound approach. Where no convenient outlet is available the flood channel must more or less parallel the natural channel and result in more disturbance.

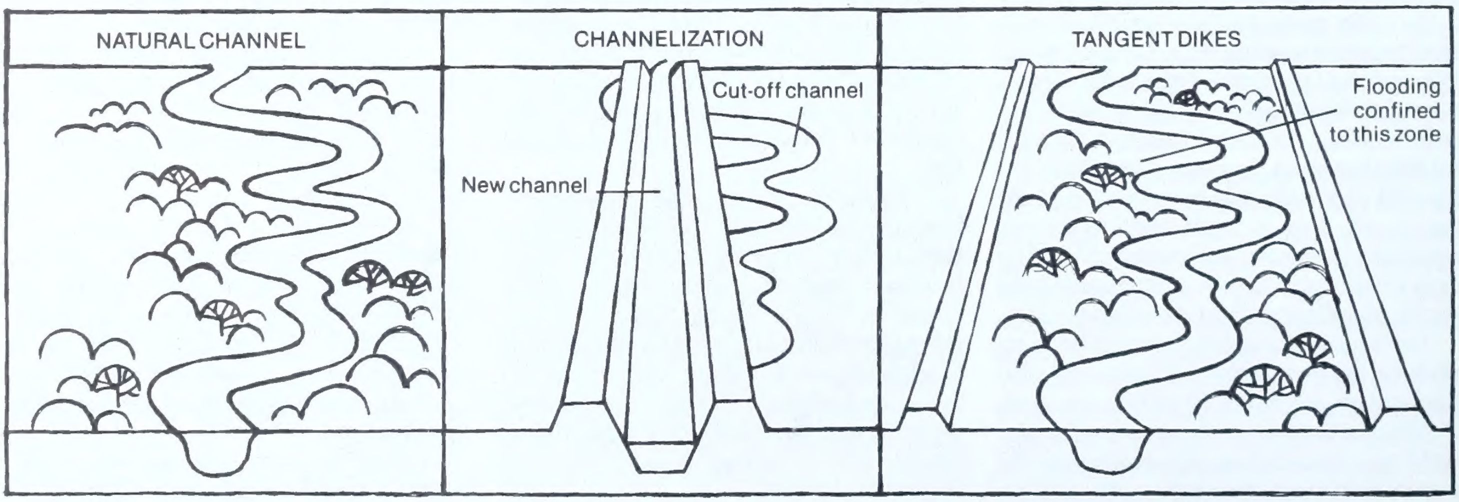
Yet another approach would involve the construction of "tangent dikes". Such dikes, constructed some distance from the river, would leave the river channel and adjacent shorelands totally untouched and preserve both their natural and aesthetic values. They would allow the river to overtop its banks during periods of high flows but would confine the water to the lands between the dikes. The flood damage between the dikes would be more severe than normal, but this would likely still be preferable to the certain destruction of channelization.

Soft approaches to design can carry right through to the detailing of a project. For example, channel alteration often requires the protection of portions of the banks from erosion. The standard approach is to place rock "rip-rap" on those portions of the river bank where such protection is required. While this is totally effective and in many cases not unsightly, there are many other options open which are rarely considered. For example, there are a number of perforated concrete paving products available that can be used to provide protection but allow grass and shrubs to grow through them to soften the appearance of the work. Perhaps the softest approach, however, is to use bundles, or mattresses, of willow cuttings staked to the river banks. Some of the willows will root and grow and provide a permanent living barrier to erosion.

Each design solution has its place. The difficulty comes in attempting to identify the type of solution appropriate to a given problem. As previously stated, water resource management projects are generally undertaken in response to a given problem and the designer must respond to the problem as stated. If asked simply to provide a certain level of flood control along a given stretch of river, he is likely to design the most straightforward, economical solution he can, regardless of environmental effects. If on the other hand, he is asked to provide as much flood control as possible while preserving as much shoreline vegetation as possible, he may come up with quite a different solution or more likely a number of options differing greatly in cost, environmental desirability and degree of flood control.

The ultimate decision is one of values.

Ronald J. Middleton is an environmental impact analyst in the planning services branch of Alberta Environment's planning division. His background is in landscape architecture.



Letters to the Editor

Environment Views welcomes letters pertaining to environmental concerns and/or response to articles in past issues of the magazine. Publication of the various opinions in no way implies endorsement by either Alberta Environment or this magazine. Letters must be signed, and Environment Views reserves the right to edit them for length.

EDMONTON JOURNAL

Grand Cache...
"Thought needs to be given to designing new communities with the basic needs of human beings in mind."

Newcomer Turnover A Concern

I found the article on some of the social and environmental considerations of resource development in Alberta, which appeared in the last issue of Environment Views to be of great interest. ("What does the future hold?" - Volume 2, No. 2, June/July 1979.) I felt, however, that more could have been said on the social impact of resource development not just on the existing communities adjacent to large-scale coal and oil operations, but also on the large numbers of newcomers who are encouraged to relocate close to such activities.

Of major concern to planners, for both economic as well as humanitarian reasons, is the extremely high turnover rate amongst the residents of new towns. Not only does the need to constantly recruit and train new employees lead to increased operating costs, but also such continuous fluctuations in a town's resident population makes it extremely difficult for a sense of community to emerge.

One basic reason for the constant movement of persons into and out of resource towns appears to be the extremely high stress levels which many of the new residents experience. Among the reasons which researchers have identified as factors promoting a general dissatisfaction with life in a new town in Alberta include "culture shock" (arising from the lack of familiar surroundings, people, and behavior patterns), lack of informal social support systems (including the absence of friends and relatives to share concerns with), inadequate housing supply, the high cost of living, the lack of employment opportunities for women and youth, the noise, dust, and pollution, which accompany intense construction activity, the lack of facilities (such as schools, hospitals, community centres, and day care centres), the geographic isolation of the town, the impact of shift work on the family, and inflexible government services and institutions.

In Grand Cache, it was clear from the testimony submitted to the Crump Commission in 1973 that many of that town's new residents felt that they had been given misinformation, particularly concerning resettlement allowances and facilities which actually existed in the town, and that had consequently led to a great deal of resentment.

If Alberta's resource industry is to maximize its profits in future, and if many expensive social and health problems associated with new town development are to be avoided, thought needs to be given to designing the new communities with the basic needs of human beings in mind. This would involve going beyond the provision of an expensive recreational complex, or statutory social services, and instead, encouraging a self-help approach towards the development of the community.

The employment of skilled community workers, similar to those who have been utilized in many of Great Britain's new towns since the last war, could ensure that low-cost social services, sensitive to the needs of people, could be developed in Alberta's resource towns. Such personnel could assist newcomers to become integrated into the community by organizing orientation sessions, promoting women's groups, training volunteers as lay counsellors, assisting with the formation of parents' groups, encouraging healthy activities for youth, promoting better understanding between persons from different ethnic backgrounds, and helping government institutions to remain responsive to changing community needs.

The recognition of the uniqueness of Alberta's rapidly expanding towns, and the need, therefore, for the employment of skilled personnel to facilitate the acceleration of a settlement's identity, could do much to improve the quality of life for residents, as well as reducing such tragic human problems as alcohol/drug abuse, child neglect, marital breakdown, mental illness, and vandalism.

In the case of Alberta's expanding communities, as well as in more established towns, "an ounce of prevention would be worth a pound of cure".

David Harris
Consultant, Preventive Social Services
Alberta Social Services and Community Health

Expansion Report Error

In the June-July 1979 issue of Environment Views in the Environment Update section on Page 32 in the GCOS "Protection Measures Included" article, it is indicated that the installation of the electrostatic precipitators (ESP) at a cost of $26 million is included as an environmental protection measure in the $195 million expansion.

This article is incorrect in that Alberta Environment imposed the requirement for the installation of the ESP on GCOS in the Clean Air Licence in 1973. Their latest expansion plans did not materialize until 1978, five years after the requirement for installation of ESP.

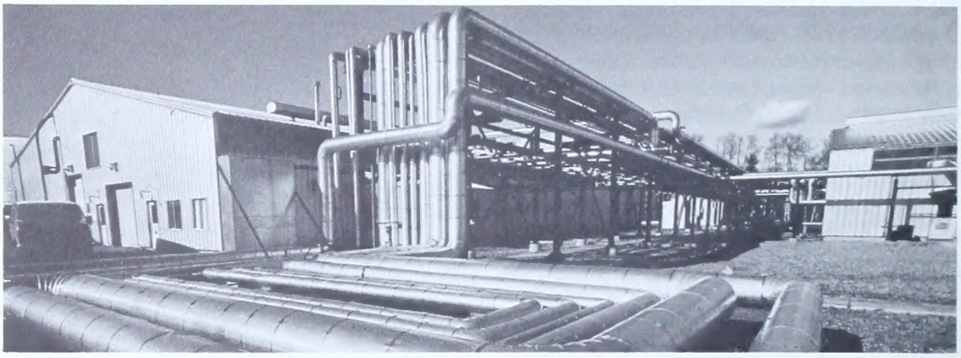
S.L. Dobko, P. Eng.
Head, Air Quality Branch
Alberta Environment

If undelivered, return to:

Environment Views
Alberta Environment
9820 - 106 Street
Edmonton, Alberta T5K 2J6

CANADA
NATIONAL LIBRARY
BIBLIOTHÈQUE NATIONALE
GOVERNMENT PUBLICATIONS
COLLECTION
DES
PUBLICATIONS DU GOUVERNEMENT

Environment Update


EDMONTON JOURNAL

Oil sands development in Alberta: an increased risk of acid rain?

Pipeline Break Report Out

The City of Edmonton, a pipeline company, and city-contracted construction crews have been blamed for last March's rupture of a high-pressure propane line in the Edmonton subdivision of Mill Woods.

The Energy Resources Conservation Board (ERCB) has reported that the rupture, which led to the overnight evacuation of some 19,000 people from the area, was caused by construction crews damaging the line, and by inadequate monitoring of construction activity around the line by the city and Rimbey Pipe Line Co. Ltd.

In its report, the ERCB promised to tighten pipeline controls and to undertake a study of pipeline relocation to a restricted development area away from residential neighborhoods.

Acid Rain Threat

An Environment Canada report just released says the acid rain killing off thousands of eastern lakes could become a serious problem in the west as development of Alberta's oil sands is stepped up in the next 10 years.

Acid rain results from a reaction of chemicals with water vapor in the atmosphere. Sulphur dioxide and nitrogen oxides, produced by coal-, oil- or gas-fired plants are responsible for the acidity which can fall in rain, snow or hail.

The report says sulphur dioxide emissions from all provincial sources, including sour gas processing, amount to about 550,000 metric tonnes a year.

Rivers Bill Introduced

Alberta rivers will be protected for recreation and wildlife purposes, if a bill proposed by Social Credit MLA Dr. Walter Buck is passed.

Buck introduced the bill, the Recreational Rivers Act, "to preserve our natural environment for the long-term benefit of all Albertans." The bill was also introduced last year but failed to reach the debate stage.

Milfoil Threat Seen

Tests conducted at Agriculture Canada's Lethbridge research station show that Eurasian water milfoil, a weed running wild in southern B.C., could endanger prairie irrigation systems if it spreads east.

Considered a tropical plant, the Eurasian milfoil was believed to be unable to survive cold winter climates. But tests reveal it will continue to grow in water as cold as six degrees Celsius. Winter growth under ice is also possible--and the plant has been found to grow faster than native water plants and can grow in nutrient-poor waters.

Tougher Laws Promised

Government officials have told the quarterly meeting in Edmonton of the Canadian Gas Processors' Association that natural gas processors face tougher environmental laws and costly regulatory delays because of increasing public concern over the safety of oil and gas operations.

Lloyd Bellows, manager of the ERCB's development department, said the oil industry had not kept the public sufficiently informed about its activities, so more hearings, with increased public participation, would take place.

Disposal Plant Planned

A unique disposal plant which would destroy chemical wastes such as dioxin and PCBs from the western provinces is being planned in the Fort Saskatchewan area, some 15 kilometres from Edmonton. Kinetic Contaminants Canada Ltd. president Gerry Gerke says the plant would be the only facility of its kind in Canada.

Plans for the plant have already met opposition from local residents, who object to the presence of such a facility in their area.

Emissions Report Compiled

Data on industrial sulphur emissions in Alberta for the period 1974-1978 have now been compiled in report form by Alberta Environment's research secretariat.

The data are based on company reports made to the Energy Resources Conservation Board and Alberta Environment, and were collected in response to concern shown by participants at Alberta sulphur gas workshops in 1973 and 1975.

If you have a short news item of province-wide interest you'd like to contribute to Environment Update, please send it to the editor at the address on the Contents page. The editor reserves the right to select and edit the items.